REMARKS/ARGUMENTS

This application contains claims 1 through 16. Claim 5 has been amended to address the objections presented in the Office Action under 35 USC Section 112, second paragraph. Claim 11 was amended only to correct a typographical (spelling) error. Claims 1 through 4, 6 through 10, and 12 through 16 remain unchanged.

Claim 5 was amended to depend from claim 3 instead of claim 4. In view of this amendment, the objection to claim 5, presented under 35 USC Section 112, second paragraph, is considered moot.

Claims 1 through 16 were rejected under 35 USC Section 103(a) as being unpatentable over (i) U.S. Patent No. 6,063,741 to Naitoh et al. (hereinafter the "Naitoh et al. patent"), in combination with either U.S. Patent No. 6,139,022 to Iwashita et al. (hereinafter the "Iwashita et al. '922 patent") or U.S. Patent No. 6,325,385 to Iwashita et al. (hereinafter the "Iwashita et al. '385 patent"); or, alternatively, (ii) U.S. Patent No. 6,444,624 to Walker et al. (hereinafter the "Walker et al. patent"), in combination with U.S. Patent No. 6,893,720 to Nakahigashi et al. (hereinafter the "Nakahigashi et al. patent"). Each of the Naitoh et al. patent and the Walker et al. patent was cited as teaching lubricating oil compositions containing, *inter alia*, molybdenum compounds. Each of the Iwashita et al. '922 patent Iwashita et al. '385 patent and the Nakahigashi et al. patent was cited for teaching object, such as engine parts, coated with a diamond-like carbon film. It is alleged that, because lubricants containing molybdenum compounds are described generally having advantageous properties, it would obvious to use such compositions to lubricate parts having diamond-like carbon (DLC) coatings. Applicants respectfully traverse these grounds for rejection.

While each of the Naitoh et al. patent and the Walker et al. patent may lead one of ordinary skill in the art to expect that molybdenum compounds would provide advantageous properties to engine lubricants for conventional engines (containing no diamond-like carbon coated parts), it would be understood that such additives provide different effects, or may be more or less effective, depending on the type of surface being lubricated. There is nothing in the either of the primary references that would suggest that molybdenum additives would provide any advantage in lubricants for lubricating diamond-like carbon coated surfaces as described in each of the Iwashita et al. '922 patent Iwashita et al. '385 patent and the Nakahigashi et al. patents.

More specifically, there is nothing in either the Naitoh et al. patent and the Walker et al. patent that would lead one to expect that the addition of molybdenum compounds to lubricants for lubricating engines having diamond-like carbon parts would provide any improved fuel economy benefit, relative to less expensive organic friction modifiers, such as glycerol monooleate (GMO).

That a teaching regarding the effect of a lubricant additive on one type of surface cannot necessarily be applied to the lubrication of another type of surface is demonstrated by the data of the present specification which shows that whilst GMO exhibits significant reduction in friction coefficient in a steel on steel lubrication situation, the effect is hardly noticeable in a DLC on DLC lubrication situation. Based on the disclosures of the prior art references, the skilled person could not predict whether molybdenum compounds would be effective in reducing the friction of DLC coated surfaces. Furthermore, the skilled person could not have predicted the degree of benefit provided by the use of a molybdenum compound to lubricate a DLC coated surface. Applicant considers that the Examples of the invention demonstrate the clearly unexpected and significant effect of the present invention.

The Examples compare the effects of known friction reducing agents in two situations, steel on steel lubrication and DLC on DLC lubrication. In order to give a clearer picture of these measurements the following Tables express numerical reductions (or increases) from the base level at zero time, and the percentage changes (in the case of the friction modifiers). The data are derived from the existing data of the Examples. The Tables have also been condensed, taking the figures at 0 to 4, 6 and 8 hours only.

Table A – Steel on Steel Lubrication – Changes over Time

Time (hr)	Base Oil	Base Oil + 550ppm Mo		Base Oil + 0.3% GMO	
	Change	Change	% change	Change	% change
0	0.154*	-0.024	-16	-0.020	-13
1	-0.024	-0.063	-41	-0.036	-23
2	-0.008	-0.059	-38	-0.035	-23
3	-0.005	-0.055	-36	-0.032	-21
4	+0.005	-0.053	-34	-0.030	-20
6	+0.018	-0.053	-34	-0.026	-17
8	+0.021	-0.052	-34	-0.023	-15

Table B – DLC on DLC Lubrication – changes over Time

Time (hr)	Base Oil	Base Oil + 550ppm Mo		Base Oil + 0.3% GMO	
	Change	Change	% change	Change	% change
0	0.111*	+0.002	+1.8	0	0
1	+0.008	-0.035	-31.5	-0.002	-1.8
2	+0.009	-0.040	-36	-0.002	-1.8
3	+0.008	-0.043	-39	-0.002	-1.8
4	+0.008	-0.044	-40	-0.002	-1.8
6	+0.010	-0.044	-40	+0.001	-0.9
8	+0.010	-0.044	-40	+0.001	-0.9

*denotes the initial value of the friction coefficient for the base oil in each Table. All other figures are changes with respect to this initial value. A negative value indicates a reduction of friction coefficient and a positive value represents an increase of friction coefficient.

The data show that in the conventional steel on steel situation both friction modifiers have a significant effect in reducing the friction coefficient. Although the molybdenum compound is somewhat more effective in an absolute sense, the GMO is more cost effective due to the far higher cost of the molybdenum compounds relative to organic friction modifiers. Therefore, for approximately equal effect, one would elect to use the organic friction modifier.

In the DLC on DLC case, it is seen that the glycerol monooleate (GMO) has no significant effect on the coefficient of friction. On the other hand, despite the fact that the base level of friction is already very much lower, the molybdenum compound is shown to reduce the coefficient of friction by at least as much, if not more (in percentage terms), than in the steel on steel case. There is also an indication from the data that the reduction in friction coefficient increases with time, compared with the steel on steel case.

In summary, Applicant submits that that, based on the disclosures of the cited prior art references, one of ordinary skill in the art would have no basis for predicting the friction-reducing properties of molybdenum compounds on DLC-coated surfaces relative to that of other commonly used friction modifiers widely used in conventional engines and thus, would not be motivated to formulate a lubricant using a molybdenum compound for the lubrication of DLC coated surfaces. Therefore, applicants submit that the cited combination of references fails to fairly render the claimed invention obvious under Section 103.

Based upon the foregoing, applicants respectfully request that all grounds presented under Sections 112 and 103 be withdrawn and the application now be passed to issue.

Respectfully submitted,

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